# Near freezing temperature storage alleviates cell wall polysaccharide degradation and softening of apricot (*Prunus armeniaca* L.) fruit after simulated transport vibration

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## Abstract

The commodity attribute of apricot fruits may greatly decline during transportation and storage. Although the efficacy of near freezing temperature (NFT) storage for maintaining apricot quality has been reported, previous studies did not investigate the effects on cell wall structure, cell ultrastructure, and the composition and activities of cell wall degrading enzymes after simulated transport vibration. The objective of the present study was to evaluate the cell wall metabolism and postharvest quality of 'Xiaobai' apricots during storage at 4–6 °C, 1–2 °C, or NFT for 49 d after simulated transport vibration. Quality parameters, cell wall composition, cell wall degrading enzymes, and cell ultrastructure were analyzed. The results indicated that NFT storage considerably delayed the senescence of apricots, including the inhibition of loss of firmness and decrease in total soluble solid content (TSS), titratable acid (TA) content and L*, a*, b*, compared with storage at 4–6 °C and 1–2 °C after simulated transport vibration. NFT storage markedly suppressed the respiration rate and maintained a higher content of ascorbic acid and lower membrane permeability during the storage period compared with storage at 1–2 °C and 4–6 °C. Furthermore, NFT storage could delay apricot fruit softening after simulated transport vibration, as indicated by delayed the degradation of $Na_2CO_3$-soluble pectin (NSP) and cellulose content, and slowed down the increase in water-soluble pectin (WSP) and chelate-soluble pectin (CSP) of cell walls, maintained lower pectin methylesterase (PME) and polygalacturonase (PG) activity, and inhibited the increase in cellulase and β-galactosidase (β-Gal) activity compared with storage at 4–6 °C and 1–2 °C. Microscopic observation showed that NFT storage delayed the degradation of pectin fraction and protected the plant cell wall

structure. In conclusion, NFT storage changes the cell wall structure and the composition and activities of cell wall degrading enzymes in apricot fruits. These results suggested that NFT storage is an effective method to delay the softening process and preserve the quality of apricots after simulated transport vibration.